source is an LED.

REMARKS

Claims 2, 5, 7-13, and 15 are pending in the application, claims 4, 6 and 14 having been cancelled without prejudice by the present amendment. The features of the canceled claims 4, 6 and 14 have been incorporated in the independent claims 10 and 12 with minor editorial changes for the sake of better clarity. In particular, the term "grading" in claims 10 and 12 has been replaced by "gradation". The term "gradation" is supported as well as most clearly explained, e.g., on page 2, lines 12-13, of the specification.

The following remarks will address the issues of the Office Action of July 3, 2002 in the order in which they were stated by the Examiner.

According to item 1 of the Office Action, claim 12 stands objected to because of insufficient antecedent basis for the feature "the timing disk or the timing ruler". Claim 12 has been amended by replacing the "the timing disk or the timing ruler" with --the timing device-- as suggested by the Examiner. Withdrawal of the objection is respectfully requested.

According to item 2 of the Office Action, claim 15 stands objected to under

37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Examiner stated that claim 15 depends on claim 5 but does not further limit claim 5. Applicant respectfully submits that the Examiner misread claim 15, insofar as claim 15 (according to applicant's amendment of April 2, 2002) depends on claim 10 rather than claim 5. Claim 5 and claim 15 both depend directly on independent claim 10. Therefore, applicant respectfully submits that there are no grounds for the foregoing objection and that it should be withdrawn.

According to item 3 of the Office Action, claims 2, 4, 6, 7 and 10-12 stand rejected under 35 USC § 103(a) as being unpatentable over Holzapfel et al. (US Patent 6,392,224) in view of Braun (US Patent 5,508,088). The rejection is based on the Examiner's attempt to read the aforementioned claims on a combination of Holzapfel et al. ('224) and Braun ('088). Applicant respectfully disagrees with the Examiner's interpretation of Holzapfel ('224) at least with regard to the Examiner's finding that Holzapfel's code markings "have a detectable grading (*of optical density levels*) for generating position signals (Fig. 2b)".

As illustrated and described in Holzapfel et al. ('224), e.g., in Fig. 2 and in col. 5, lines 1-10, as well as col. 5, lines 23-38, the markings used by Holzapfel et al. are **transparent and opaque** (in the case of the transmitted light version) or **reflective and non-reflective** (in the alternative case of an incident light arrangement). Holzapfel uses the opaque and transparent (or reflective and non-reflective) marking fields to

create periodical signals (shown at 8 in Fig. 1) and non-periodical signals (shown at 7 in Fig. 1).

Braun ('088) likewise uses only an opaque vs. transparent differentiation of the marking elements on a timing device.

In contrast, independent claims 10 and 12 of the present application (as amended herein) require that the groups of code markings have "a detectable gradation of optical density levels" and that "the detectable gradation is used for generating control or position signals". Applicant respectfully asserts that it would be impossible to equate the "detectable gradation of optical density levels" of the code markings in the present application (also referred to as "gradation in gray levels", e.g., on page 2, line 12) with the merely opaque vs. transparent differentiation of the markings used by Holzapfel as well as Braun.

As explained on page 4 and illustrated in Figures 1 to 4 of the present application, the different levels (i.e., the gradation) of optical densities produces a scanning signal that contains additional position information in the form of different signal amplitudes corresponding to the different gray levels of the markings. Further, as stated on page 2, lines 10-12, "... two or more groups of code markings can be detected independently from one another using a single sensor unit, if the code markings of the groups have a different optical density". Thus, the gradation of optical density levels in

the timing device of the present application has the advantage that it packs additional positioning information into the marking track which can be read as different signal amplitudes by a single sensor unit.

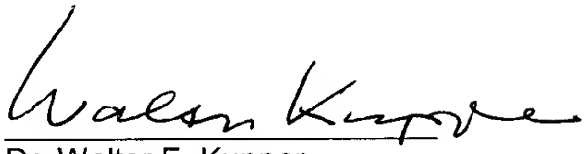
Consequently, since Holzapfel et al. ('224) as well as Braun ('088) use only an opaque/transparent (or reflective/non-reflective) differentiation of the markings, while claims 10 and 12 (as amended herein) require a "detectable gradation of optical density levels", Holzapfel et al., whether by itself or in any combination with Braun ('088), cannot be said to make claims 10 and 12 obvious in the sense of 35 U.S.C. 103(a).

Based on the foregoing argument, applicant respectfully submits that independent claims 10 and 12 (as amended herein) are patentably distinguished over Holzapfel et al. (US Patent 6,392,224) and Braun (US Patent 5,508,088), regardless of whether these references are considered by themselves or in any combination, and that claims 10 and 12 should therefore be allowed.

Applicant submits that with independent claim 10 (as amended herein) presumably being allowable, dependent claims 2, 5, 7-9, 11, 13 and 15 (as amended herein) should be allowed by virtue of their dependency from what should be an allowable independent claim 10, and the rejections against the dependent claims 2, 5, 7-9, 11, 13 and 15 in items 3 to 6 of the Office Action should therefore be withdrawn.

Each and every point in the Office Action dated July 3, 2002 has been addressed on the basis of the above amendment and remarks. Allowance of the present application with all of the pending claims 2, 5, 7-13, and 15 is earnestly solicited.

Respectfully submitted,



October 24, 2002

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Attached: Petition for one-month extension

ATTACHMENT: MARKED-UP VERSION PURSUANT TO 37 C.F.R. § 1.121 FOR AMENDMENT OF OCTOBER 24, 2002

CLAIMS:

7. (Twice amended) The timing device according to claim 10 [6], wherein the groups of code markings have a predefined difference between their optical density levels.

10. (Twice amended) A timing device comprising a carrier having a first group of code markings and at least one higher-order group of code markings disposed in at least one code track, said first and at least one higher-order group of code markings being scanned by at least one sensor unit to produce signals, said at least one sensor unit comprising a light source and a photo-transistor, wherein the at least one code track has a different optical density compared to the first group, wherein the code markings of the at least one higher-order group overlap with the code markings of the first group in the at least one code track, wherein the code markings of the first group are equally spaced [have a mutually constant spacing] from one another, whereas the code markings of the at least one higher-order group are distributed over the code track with an arbitrary spacing and form [are forming] segments on the timing device for controlling different functions, wherein the first group of code markings has a predetermined optical density and the at least one higher-order group of code markings has an optical density different from that of the first group, wherein the groups of code

markings have a detectable gradation of optical density levels, and wherein the detectable gradation is used for generating control or position signals.

12. (Twice amended) A positioning device, comprising a timing device with a carrier having a first group of code markings and at least one higher-order group of code markings disposed in at least one code track, with the code markings being scanned by at least one sensor unit for producing a signal, said at least one sensor unit comprising a light source and a photo-transistor, wherein the at least one code track has a different optical density compared to the first group, wherein the code markings of the at least one higher-order group overlap with the code markings of the first group in the at least one code track, wherein the code markings of the first group are spaced at constant intervals from one another, whereas the code markings of the at least one higher-order group are distributed over the code track with an arbitrary spacing and form [are forming] segments on the timing [disk or the timing ruler] device for controlling different functions, and wherein the code markings of the at least one higher-order group are used for at least one of the purposes of controlling a start position, controlling an end position, calibrating the timing device, and determining an absolute position of the timing device; said positioning device further comprising a signal processing device that converts the sensor signal into a control signal and is connected after the sensor unit, wherein the first group of code markings has a predetermined optical density and the at least one higher-order group of code markings has an optical density different from that of the first group, wherein the groups of code markings have a detectable

gradation of optical density levels, and wherein the detectable gradation is used for generating control or position signals.

13. (Amended) The timing device according to claim 10 [4], wherein the light source is an LED.

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